Roads Concurrency Modeling Review

King County Auditor's Office

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July 10, 2006

Study Background

- Program required to ensure that infrastructure is in place concurrent with development
  - Traffic impacts of new developments modeled and resulting congestion compared with level of service standards
- Changes to concurrency program in 2004; questions about impact of changes
  - Level of service standards changed
  - New method of calculating level of service adopted
- Mirai Transportation Planning and Engineering selected to conduct the study

Study Scope

- Mirai asked to address questions about:
  - Whether the Roads Services Division follows standard industry traffic modeling practices for the roads concurrency program
  - Impact of adopted changes on future development patterns and need for improvements to the road network

Overview of Study Results

- Program overly complex and uses questionable modeling practices

- Modeling practices lack transparency and quality control

- Council's 2004 changes to standards would allow additional development in general, but not in all areas

- Technical changes to modeling practices had a greater impact than policy changes to standards and methods

- 11 recommendations are intended to reduce complexity, and improve modeling practices and quality control

King County Concurrency Modeling Review

Prepared for
King County Auditor's Office
King County Council

Prepared by
Mirai Transportation Planning & Engineering

July 10, 2006

Presentation Outline

- Background on transportation concurrency
  - Role of concurrency within long-range transportation planning
  - Concurrency requirement
  - King County's actions
- Answers to Council questions
  - Consultant recommendations
- Questions

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Concurrency vs. Long-Range Transportation Planning

- The Growth Management Act requires:
  - Transportation Element identify facilities to support growth based on:
    - Projected growth (at least 10 years)
    - Level of service standards to measure traffic congestion
  - Development of a financing plan that includes:
    - Actions to balance growth, traffic congestion and funding needs

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Concurrency Requirement

- Adopt an ordinance which:
  - Prohibits development approval, if the development causes the level of service to decline below the standards adopted in the Transportation Element
  - *unless transportation improvements to accommodate the impacts of development are made concurrent with the development*.

Concurrency Requirement

- "*Concurrent with the development*" means that:
  – improvements are in place at the time of development, or that
  – a financial commitment is in place to complete the improvements within <u>*six years*</u>"
    - A reason for needing a traffic model

King County Actions

- Council adopted first concurrency ordinance in 1995

- Council adopted a new approach for residential developments in 2001:
  - Pre-drawn map based concurrency determination
  - Map showed where residential growth was concurrent with transportation facilities
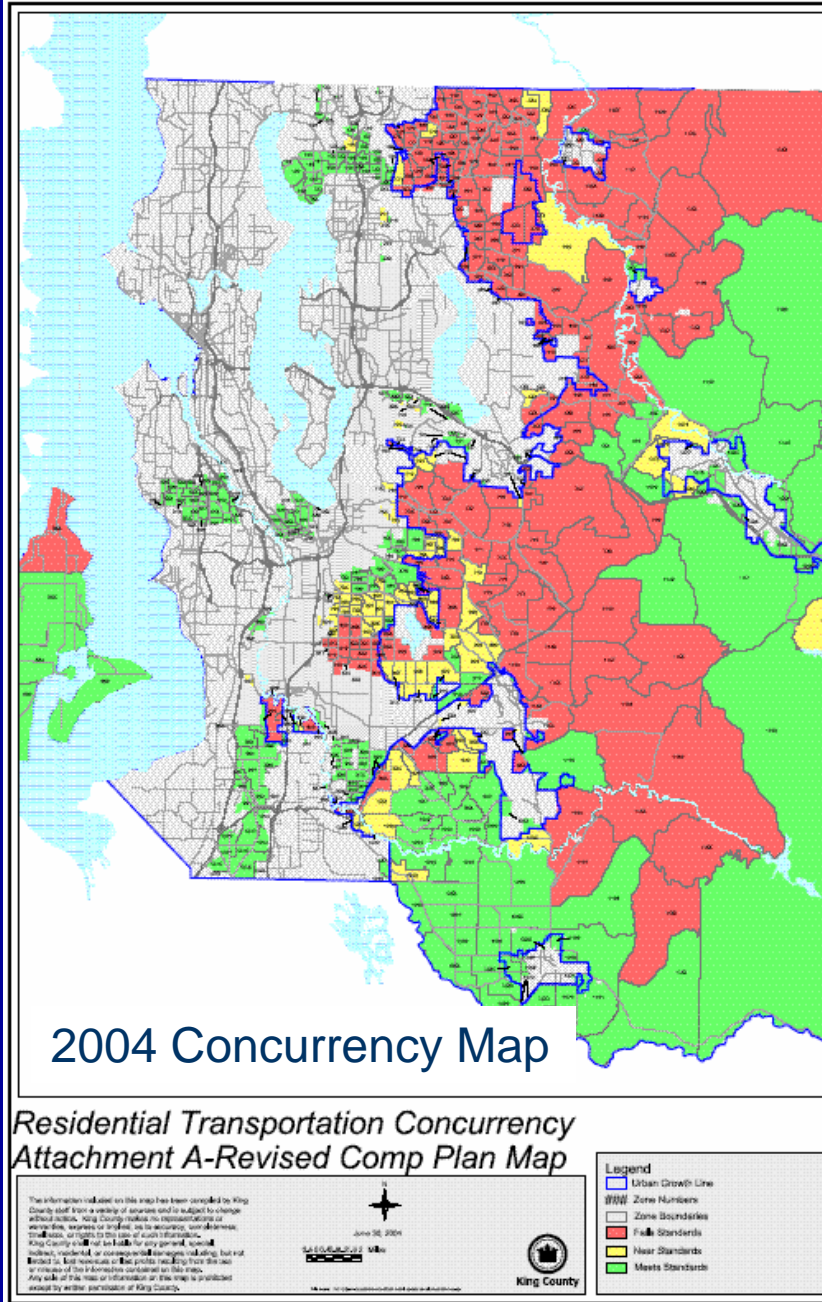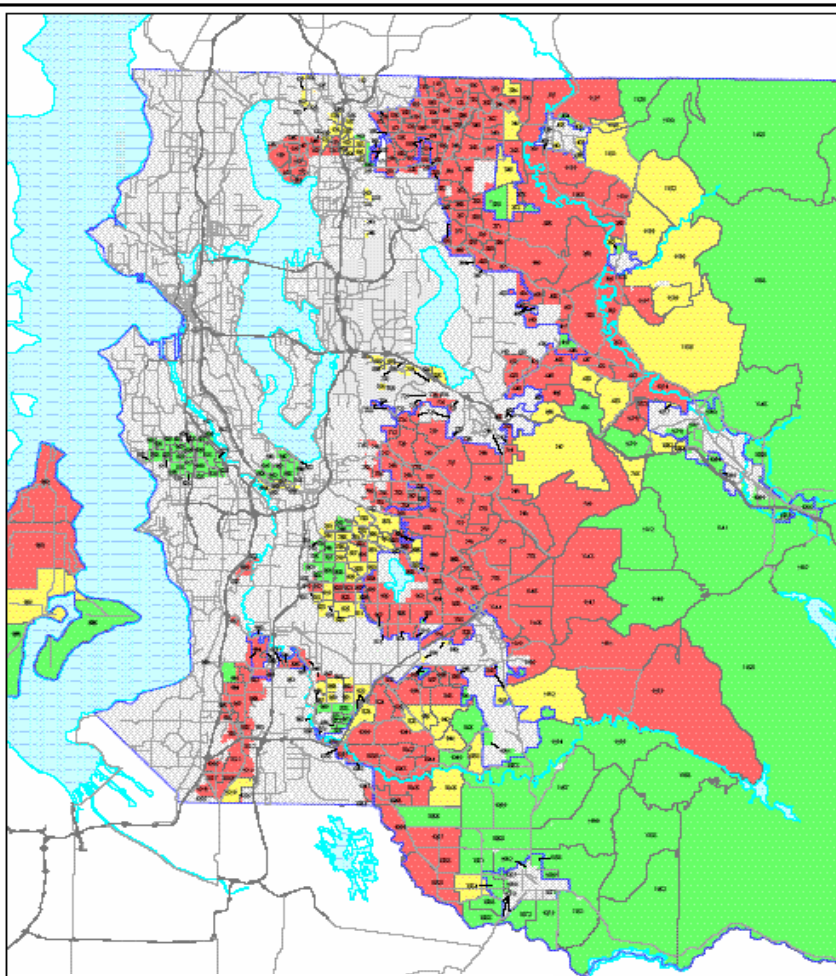 - This approach still in effect

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King County Actions (2004)

- Council accepted more growth and congestion in Urban Area by adopting level of service standard of "E"

- Council adopted the new travel time method to measure traffic congestion in 36 monitored corridors (The standards were not changed)

- Road Services staff changed several modeling practices

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Results of King County Actions

- 2004 Concurrency Map
  - Green zones – development allowed
  - Yellow zones – within 10 percent of the standards, special analysis required
  - Red zones – development denied

2004 Concurrency Map

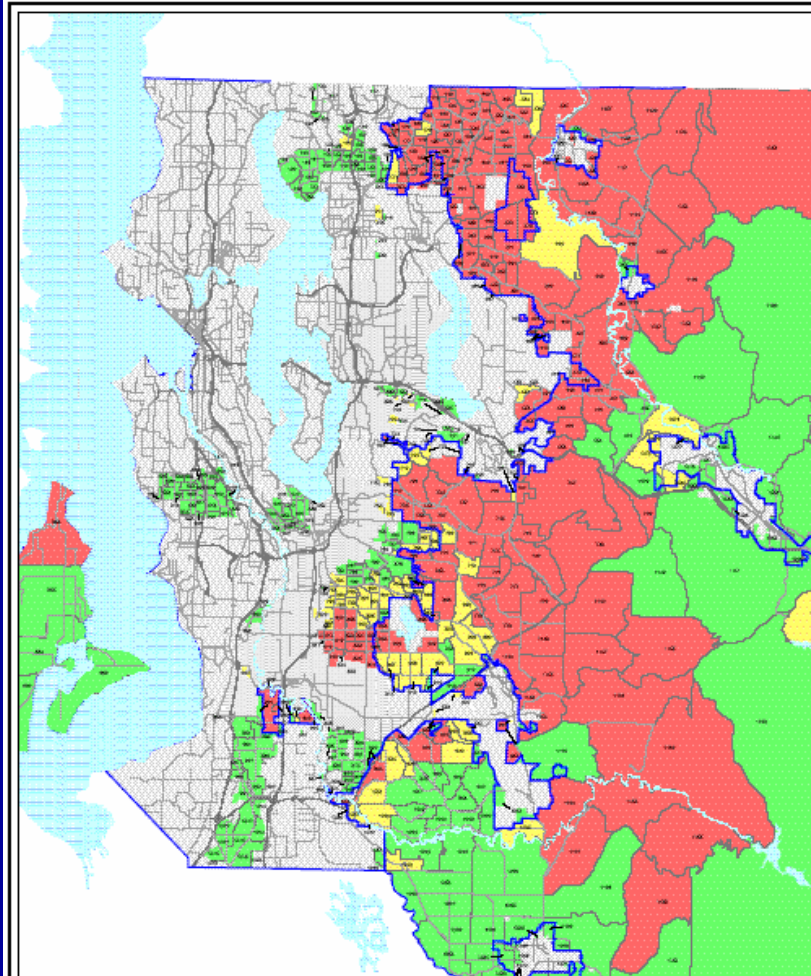*Residential Transportation Concurrency Attachment A-Revised Comp Plan Map*

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2003 Concurrency Map

Transportation Concurrency — Attachment A
Level of Service Standards Status

2004 Concurrency Map

Residential Transportation Concurrency
Attachment A-Revised Comp Plan Map

July 10, 2006   Committee of the Whole

King County Actions

- Comparison of the Concurrency Maps between 2003 and 2004
  - Red zones decreased in *Urban Area* – developments became *more* concurrent with transportation facilities
  - Red zones increased in *Rural Area* – developments became *less* concurrent with transportation facilities

King County's Level of Service (LOS) Standard Definitions

	Urban Growth Area	Rural Area
Level of Service Standard	"E" Short subdivisions: exempted	"B" Short subdivisions: not exempted
Volume-to-Capacity Ratio	0.99	0.69
Travel Time (Vehicle Speed) — Principal Arterial	13 mph	28 mph
Travel Time (Vehicle Speed) — Minor Arterial	10 mph	24 mph
Travel Time (Vehicle Speed) — Collector Arterial	7 mph	19 mph

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Level of Service Methods

- King County uses two methods to measure traffic congestion
  - Average weighted volume-to-capacity ratios
  - Travel time
- Unusual to use two methods within one jurisdiction

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Level of Service Methods

- Average volume-to-capacity ratio is called Transportation Adequacy Measure (TAM):
  - Applied to countywide roads
  - Not an effective method to measure traffic congestion
  - Very difficult to find causes for zone to become red
  - Very difficult to find cost-effective transportation solutions

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Level of Service Methods

Transportation Concurrency

Monitored Corridors with Segments

- Travel time method is applied to 36 monitored corridors
  - Adopted in 2004
  - Include roads in cities
  - Most effective method to measure traffic congestion
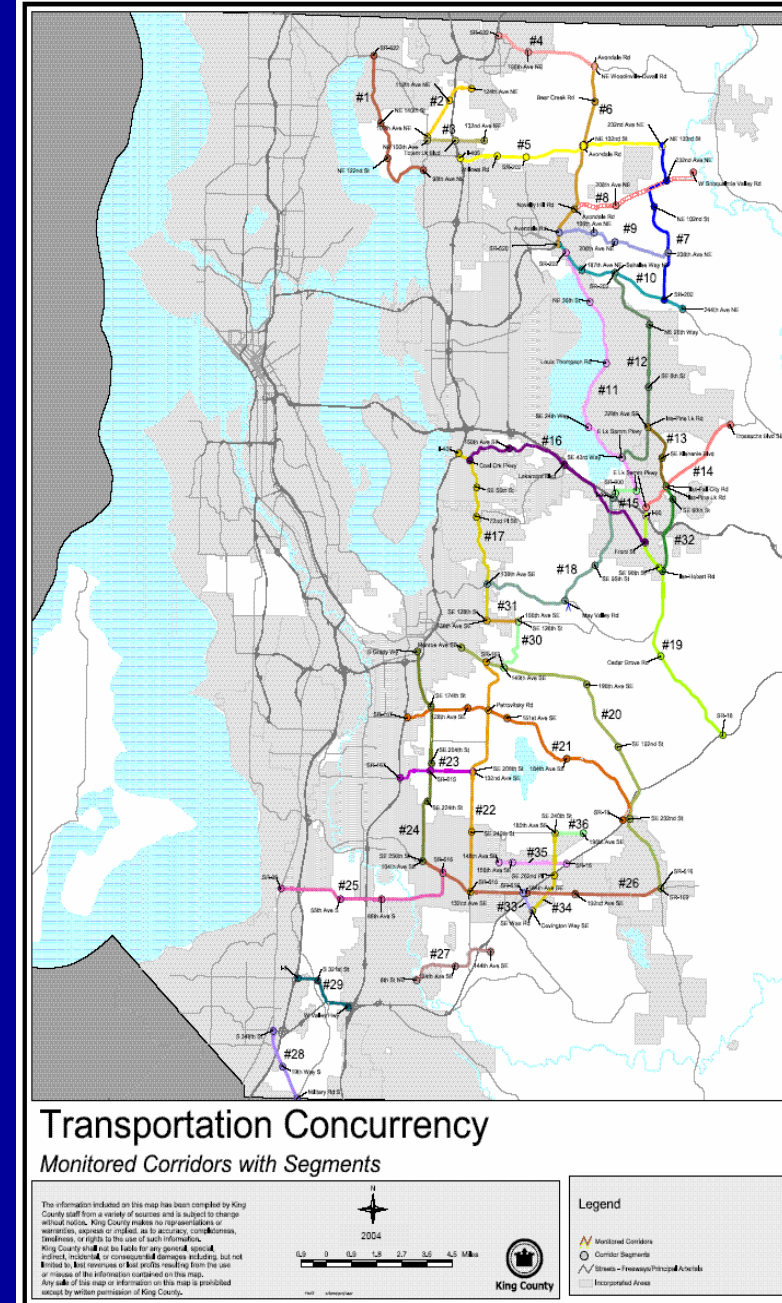
Concurrency Testing Process

- Residential development
  - Pre-drawn map based
  - Concurrency check is simple but development of the map is complex
  - Complex technical assumptions are used in the model
  - Those assumptions are not well documented
- Commercial (non-residential) development
  - Each development proposal is modeled (the map based approach is not used)
  - Traditional traffic analysis

Summary of Concurrency Program

	Countywide	Monitored Corridors
Traffic Congestion Measurement Method	Transportation Adequacy Measure (TAM): average volume-to-capacity ratios	Travel Time *

	Urban	Rural
Level of Service Standard	E *	B
Short Subdivision Exemption?	Yes*	No

	Residential	Commercial
Concurrency Testing Process	Map-Based	Individual Modeling
* Elements that were changed in 2004		

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Specific Question and Answer

- Does King County's base transportation model used for transportation planning employ best practices for transportation modeling?

- Answer: yes, it is generally sound
  - It has been six years since this model was fully updated
  - Some updates were made in 2003
  - Puget Sound Regional Council has completed its regional model update this year
  - Further updates are warranted

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Recommendations

1. Update the base year model
2. Adopt the key features of the regional model that are useful for King County's concurrency model

Specific Question and Answer

- Is the concurrency model documented and consistent with best practices?

- Answer: no, we found many problems:
    - Concurrency model is overly complex
    - Quality control is poor
    - Many technical assumptions have not been documented and presented to Council
    - Modeling techniques are not consistent with standard practices and do not reflect driver behaviors

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Answer Continued

– Traffic congestion as measured by the model was significantly reduced in 2004 – not true based on our experience

– Road Services staff could not explain the reason for this change

– Verifying the accuracy of the modeling is very difficult

– Transportation Adequacy Measure (TAM) is a poor measure of traffic congestion

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Recommendations

3. Revise and simplify the concurrency program:

- Use a single standard for measuring traffic congestion

- Eliminate the method of volume-to-capacity ratios (Transportation Adequacy Measure)

- Use a single process for testing concurrency for all types of developments

- Eliminate the yellow zones concept

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Recommendations

4. Improve quality control and make the concurrency model more transparent:

   – Prepare a report annually that explains the technical assumptions used to update the concurrency model

   – Establish an independent expert panel to review the annual report before it is submitted to King County Council

Recommendations

5. Include all improvements committed by other jurisdictions in the concurrency model

6. Review the current policy that denies land use growth within unincorporated King County based on traffic congestion in the cities

7. Exclude state owned highways of statewide significance from the concurrency model

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Specific Question and Answer

- What are the impacts of the County's changes to level of service standards and methods adopted in 2004?

- Answer: the following factors have counteracted each other:
    - Allowed more development in the Urban Area due to the change in level of service standard to LOS E
    - Allowed less development due to the new travel time method
    - Allowed significant amount of development due to technical changes in modeling practices

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Recommendations

8. Assess how the travel time method has increased the unmet need of road improvements for the monitored corridors

Specific Question and Answer

- How has the unmet transportation needs changed due to changes in level of service standards?

- Answer: The changes would have the effect of reducing the unmet transportation facility needs in King County

- However, due to the stricter travel time methodology, the 2004 ordinance increased the unmet transportation needs in the Rural Area

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Recommendations

9. Examine the implications of the level of service "B" standard to the unmet need for road improvements in the rural area

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Specific Question and Answer

- When will the new level of service standards be exceeded in the monitored corridors?

- Answer: 11 monitored corridors did not meet the travel time standards in 2004
  - Difficult to answer when traffic in the other corridors will exceed the standards without more traffic impact studies

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Recommendations

10. Conduct transportation corridor studies to identify what improvements are needed on the segments that are not meeting the travel time standards

11. Adjust the travel time standards and/or land use projections, if the identified improvements are not feasible

Conclusions – Part 1

- King County must ensure that sufficient transportation facilities are in place to approve land use developments
- To meet this requirement, a technically sound concurrency model is needed
- King County's concurrency model is overly complex and not transparent
- Road Services staff use modeling practices and assumptions that are questionable
- Identifying the most cost-effective transportation solutions with the tools being used is difficult
- King County's concurrency program treats different types of development differently

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Conclusions – Part 2

- Concurrency program lacks sufficient quality control
- These points raise concerns about the accuracy and equity of the program

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- The improvements recommended by this study will:
  - Simplify the concurrency management program
  - Improve its quality and equity
  - Improve the program's ability to achieve the balance between growth, capital funding, and traffic congestion

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Executive Response

- Concurs with five recommendations; partially concurs with three recommendations; does not concur with three recommendations
- Primary area of disagreement is with policy recommendations; e.g., assess implications of high rural LOS standard; assess impact of stricter travel time standard on facility needs
- Executive response indicates that the TNR process addresses facility needs; not concurrency program
- Executive also disagrees with elimination of Transportation Adequacy Measure of congestion

Auditor's Comments

- GMA requires jurisdictions to take actions to bring facilities into compliance with adopted standards

- Recommendations reinforce this requirement

- TNR process is not specifically oriented toward bringing facilities into compliance with standards; no mention in TNR of how projects on needs list affect compliance with level of service standards

- Because the TAM congestion measure is an abstract average, it is impossible to determine whether improvements proposed in the TNR are the most cost-effective solution for bringing facilities into compliance with standards